PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-043873

(43)Date of publication of application : 08.02.2002

(51)Int.Cl. H03F 3/68
H03F 1/42
H03F 3/24

(21)Application number : 2000-231360

(22)Date of filing : 26.07.2000

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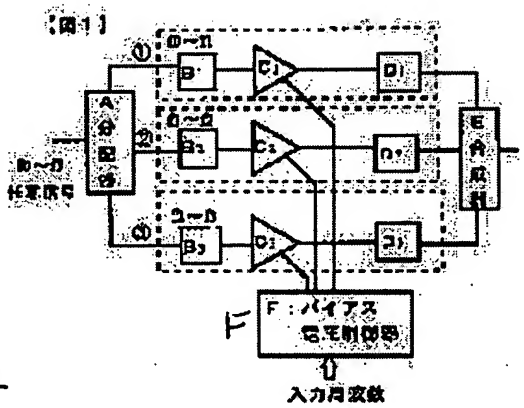
(54) WIDEBAND POWER AMPLIFIER CIRCUIT

(57)Abstract:

PROBLEM TO BE SOLVED: To provide satisfactory amplification efficiency or to suppress generation/amplification of unwanted higher harmonic waves (especially of secondary higher harmonic waves), for reducing power consumption, and moreover to deal with frequency hopping.

SOLUTION: By locating band-pass filters B1, D1, B2, D2, B3 and D3, although power amplifiers C1, C2 and C3 are respectively configured as narrow-band power amplifiers 1, 2 and 3, as to which one of power amplifiers C1, C2 and C3 is to amplify a VHF band signal, the gain in each of power amplifiers C1, C2 and C3 is controlled by a bias voltage controller F, so that only the power amplifier corresponding to a transmitter output frequency can be set in an amplified operating state.



C0077
Drawings 1-2

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

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CLAIMS

[Claim(s)]
[Claim 1] It is a broadband power amplification circuit for VHF bands. Two or more power amplifier, The band pass filter arranged according to an applicable frequency magnification property in this power amplifier [each of] order stage so that the frequency magnification property in this each of power amplifier may be arranged as a condition which adjoined as a whole, The distributor which distributes the VHF band signal as a candidate for magnification to each above-mentioned preceding paragraph band pass filter, The broadband power amplification circuit where it comes to consist of only the power amplifier according to a transmitter output frequency bias voltage controllers which carry out gain control with bias voltage also in magnification operating state among the synthetic vessel which compounds the output from [above-mentioned] the latter-part band pass filters of each, and two or more above-mentioned power amplifier.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] Drawing 1 is drawing showing the outline configuration in an example of the broadband power amplification circuit by this invention.
[Drawing 2] Drawing 2 is drawing showing the frequency magnification property of each power amplifier that the band pass filter has been arranged in the order stage.
[Description of Notations]
A -- A distributor, B1, B-2, B3, D1, D2, and D3 -- A band pass filter, C1 and C2, and C3 -- [-- Bias voltage controller] Power amplifier, E -- A synthetic vessel, F

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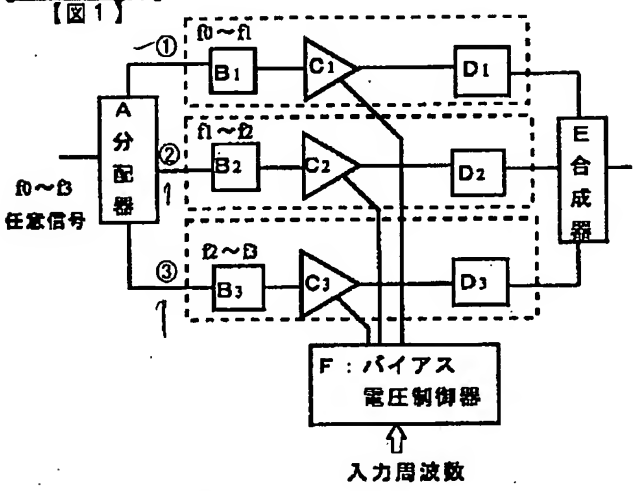
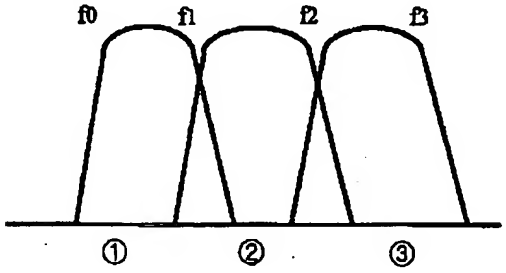
DRAWINGS

[Drawing 1]
【図１】



[Drawing 2]
【図２】



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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the broadband power amplification circuit made suitable for especially frequency hopping in a VHF band with respect to a broadband power amplification circuit.
[0002]
[Description of the Prior Art] In order to amplify a VHF band signal to a broadband until now, the actual condition is that the power amplification circuit is constituted as one wideband amplifier.
[0003]
[Problem(s) to be Solved by the Invention] However, when the frequency characteristics are constituted if possible by the flat in that case, the magnification effectiveness cannot be called fitness, but although it is broadband magnification therefore, an unnecessary higher harmonic (especially the 2nd higher harmonic) combines it in a VHF band, and it has [that a high-speed tuner and a high-speed switch require and] generating and the fault of being amplified.
[0004] The magnification effectiveness is made good and, moreover, the purpose of this invention has generating and magnification of that a high-speed tuner and a high-speed switch are made unnecessary and an unnecessary higher harmonic (especially secondary higher harmonic) in offering the broadband power amplification circuit made possible [control], when amplifying a VHF band signal to a broadband at a flat.
[0005]
[Means for Solving the Problem] The above-mentioned purpose so that the frequency magnification property in two or more power amplifier and this each of power amplifier may be arranged as a condition which adjoined as a whole The band pass filter arranged according to an applicable frequency magnification property in this power amplifier [each of] order stage, The distributor which distributes the VHF band signal as a candidate for magnification to each above-mentioned preceding paragraph band pass filter, Only the power amplifier according to a transmitter output frequency is attained with constituting from a bias voltage controller which carries out gain control with bias voltage also in magnification operating state among the synthetic vessel which compounds the output from [above-mentioned] the latter-part band pass filters of each, and two or more above-mentioned power amplifier.
[0006]
[Embodiment of the Invention] Hereafter, drawing 1 and drawing 2 explain the operation gestalt of this invention. Drawing 1 shows the outline configuration in an example of the broadband power amplification circuit by this invention. Like illustration, the thing in this example is three power amplifier (configuration as [For example,] a power transistor) C1, C2, and C3. It is constituted as it contains. These power amplifier C1, C2, and C3 The band pass filter B1 of a predetermined pass band for specifying a frequency magnification property in an each order stage again, D1, B-2, D2, B3, and D3 It was arranged. After all, they are a band pass filter B1, D1, B-2, D2, B3, and D3. By having been arranged Power amplifier C1, C2, and C3 Each is what is constituted as narrow-band power amplifier **, **, and **. Each frequency magnification property As shown in drawing 2 , they are power amplifier C1, C2, and C3. It is constituted as a thing with the frequency magnification property of (f1 -f2) and (f2 -f3), respectively (f0 -f1).
[0007] now, the arbitration VHF band signal as a candidate for magnification -- Distributor A, the preceding paragraph band pass filter B1, B-2, and B3 minding -- power amplifier C1, C2, and C3 it is given -- then on the other hand Power amplifier C1, C2, and C3 The magnification output from each through the latter-part band pass filter D1, D2, D3, and the synthetic vessel E In that case, a VHF band signal is power amplifier

C1, C2, and C3. It has depended on the bias voltage controller [by any it is amplified] F. They are power amplifier C1, C2, and C3 by the bias voltage from the bias voltage controller F so that only the power amplifier according to a transmitter output frequency may set to magnification operating state. The gain which comes out, respectively is controlled. Power amplifier C1, C2, and C3 When only any one sets to magnification operating state alternatively, reduction-ization of power consumption can be attained.
[0008]
[Effect of the Invention] As mentioned above, since a VHF band signal is amplified with narrow-band power amplifier when based on claim 1 as explained, it was presupposed that the magnification effectiveness was good, and generating and magnification of an unnecessary higher harmonic (especially secondary higher harmonic) were made possible [control], further, reduction-ization of power consumption could be attained and the band power amplification circuit which can respond to frequency hopping has been obtained further again.

[Translation done.]

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（A）　(11)特許出願公開番号
特開2002－43873
（P2002－43873A）
(43)公開日　平成14年２月８日(2002.2.8)

(51)Int.Cl.'	識別記号	ＦＩ		テーマコード'(参考)
Ｈ０３Ｆ	3/68	Ｈ０３Ｆ	3/68	Ｂ　５Ｊ０６９
	1/42		1/42	５Ｊ０９１
	3/24		3/24	

審査請求　未請求　請求項の数１　ＯＬ　（全 ３ 頁）

(21)出願番号　特願2000－231360(P2000－231360)

(22)出願日　平成12年７月26日(2000.7.26)

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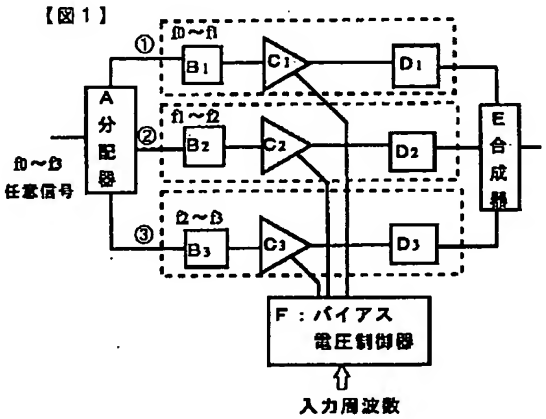
Ｆターム(参考)　5J069 AA01 AA21 AA41 CA27 CA36
CA62 CA64 FA15 KA00 KA12
KA45 SA14 TA01 TA03
5J091 AA01 AA21 AA41 CA27 CA36
CA62 CA64 FA15 KA00 KA12
KA44 SA14 TA01 TA03

(54)【発明の名称】　広帯域電力増幅回路

(57)【要約】
【課題】　良好な増幅効率や不要な高調波（特に２次高調波）の発生・増幅の抑制、消費電力の低減化が図れ、しかも、周波数ホッピングに対応すること。
【解決手段】　バンドパスフィルタB_1，D_1，B_2，D_2，B_3，D_3が配置されたことで、電力増幅器C_1，C_2，C_3それぞれは狭帯域電力増幅器①，②，③として構成されているが、ＶＨＦ帯域信号が電力増幅器C_1，C_2，C_3の何れで増幅されるかは、送信機出力周波数に応じた電力増幅器のみが増幅動作状態におかれるべく、バイアス電圧制御器Ｆにより電力増幅器C_1，C_2，C_3それぞれでの利得が制御されているものである。

【図１】



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【特許請求の範囲】
【請求項1】　VHF帯域用の広帯域電力増幅回路であって、
複数の電力増幅器と、
該電力増幅器それぞれでの周波数増幅特性が全体として隣接した状態として配置されるべく、該電力増幅器それぞれの前後段に該当周波数増幅特性に応じて配置されたバンドパスフィルタと、
増幅対象としてのVHF帯域信号を上記前段バンドパスフィルタそれぞれに分配する分配器と、
上記後段バンドパスフィルタ各々からの出力を合成する合成器と、
上記複数の電力増幅器のうち、送信機出力周波数に応じた電力増幅器のみ増幅動作状態におくべく、バイアス電圧により利得制御するバイアス電圧制御器とから構成されてなる広帯域電力増幅回路。
【発明の詳細な説明】
【0001】
【発明の属する技術分野】本発明は、広帯域電力増幅回路に係わり、特にVHF帯域での周波数ホッピングに好適とされた広帯域電力増幅回路に関するものである。
【0002】
【従来の技術】これまで、VHF帯域信号を広帯域に増幅するには、電力増幅回路は1つの広帯域増幅器として構成されているのが実情である。
【0003】
【発明が解決しようとする課題】しかしながら、その際に、その周波数特性がフラットになるべく構成される場合には、その増幅効率は良好とは云えず、高速チューナや高速スイッチが要されるばかりか、また、広帯域増幅であるが故に不要な高調波（特に第2高調波）がVHF帯域内で併せて発生・増幅されてしまうという不具合があるものとなっている。
【0004】本発明の目的は、VHF帯域信号を広帯域にフラットに増幅する場合に、その増幅効率が良好とされ、しかも、高速チューナや高速スイッチが不要とされるばかりか、不要な高調波（特に2次高調波）の発生・増幅が抑制可とされた広帯域電力増幅回路を供するにある。
【0005】
【課題を解決するための手段】上記目的は、複数の電力増幅器と、該電力増幅器それぞれでの周波数増幅特性が全体として隣接した状態として配置されるべく、該電力増幅器それぞれの前後段に該当周波数増幅特性に応じて配置されたバンドパスフィルタと、増幅対象としてのVHF帯域信号を上記前段バンドパスフィルタそれぞれに分配する分配器と、上記後段バンドパスフィルタ各々からの出力を合成する合成器と、上記複数の電力増幅器のうち、送信機出力周波数に応じた電力増幅器のみ増幅動作状態におくべく、バイアス電圧により利得制御するバイアス電圧制御器とから構成することで達成される。

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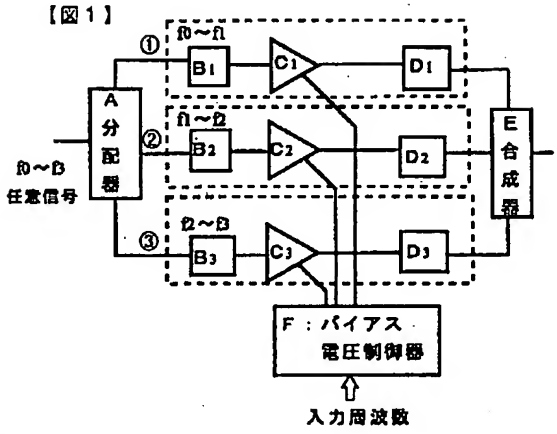
【0006】
【発明の実施の形態】以下、本発明の実施形態について図1，図2により説明する。図1は本発明による広帯域電力増幅回路の一例での概要構成を示したものである。図示のように、本例でのものは、3個の電力増幅器（例えばパワートランジスタとして構成）C_1，C_2，C_3を含むようにして構成されており、これら電力増幅器C_1，C_2，C_3それぞれの前後段にはまた、周波数増幅特性を規定するための、所定通過域のバンドパスフィルタB_1，D_1，B_2，D_2，B_3，D3が配置されたものとなっている。結局、バンドパスフィルタB_1，D_1，B_2，D_2，B_3，D_3が配置されたことで、電力増幅器C_1，C_2，C_3それぞれは狭帯域電力増幅器①，②，③として構成されているものであり、それぞれの周波数増幅特性は、図2に示すように、電力増幅器C_1，C_2，C_3はそれぞれ（f_0～f_1）、（f_1～f_2）、（f_2～f_3）の周波数増幅特性をもつものとして構成されているものである。
【0007】さて、増幅対象としての任意VHF帯域信号は分配器A、前段バンドパスフィルタB_1，B_2，B_3を介し電力増幅器C_1，C_2，C_3に与えられている一方では、電力増幅器C_1，C_2，C_3それぞれからの増幅出力は後段バンドパスフィルタD_1，D_2，D_3、合成器Eを介し得られているものであるが、その際に、VHF帯域信号が電力増幅器C_1，C_2，C_3の何れで増幅されるかは、バイアス電圧制御器Fによるものとなっている。送信機出力周波数に応じた電力増幅器のみが増幅動作状態におかれるべく、バイアス電圧制御器Fからのバイアス電圧により電力増幅器C_1，C_2，C_3それぞれでの利得が制御されているものである。電力増幅器C_1，C_2，C_3の何れか1つのみが選択的に増幅動作状態におかれる場合は、消費電力の低減化が図れるものである。
【0008】
【発明の効果】以上、説明したように、請求項1による場合は、VHF帯域信号は狭帯域電力増幅器で増幅されることから、その増幅効率は良好とされ、また、不要な高調波（特に2次高調波）の発生・増幅が抑制可とされ、更に、消費電力の低減化が図れ、更にまた、周波数ホッピングに対応し得る帯域電力増幅回路が得られるものとなっている。
【図面の簡単な説明】
【図1】図1は、本発明による広帯域電力増幅回路の一例での概要構成を示す図
【図2】図2は、前後段にバンドパスフィルタが配置された電力増幅器それぞれの周波数増幅特性を示す図
【符号の説明】
A…分配器、B_1，B_2，B_3、D_1，D_2，D_3…バンドパスフィルタ、C_1，C_2，C_3…電力増幅器、E

3　　4

…合成器、F…バイアス電圧制御器

【図1】



【図2】